MIM - Base

J1-255-Dx

Integrated Controller

Installation and Maintenance manual

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Quality in Electronic Manufacturing
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MIM_J1255Dx_EN - 23/02/2009

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1. Introduction

We thank you to have bought this QEM tool. We'll be pleased to receive any suggestions at the following e-mail address info@qem.it.

1.1. Graphical legend

The missing observance of the message can compromise the integrity of the tool and/or the result of the operation.

Note: important information for a proper use of the tool.

For further information see the manual specified in the message.

For further information see the page specified in the message.

1.2. Limited warranty

For a period of two (2) years from the original purchase date, QEM will repair or will substitute for free controls and accessories that, accordingly to a test, QEM will define to be defective in the material or in the quality.
This guarantee is valid if the unit isn't broken by unauthorized people or used in improper way.
This warranty substitute whatever other warranties, both express and implicit.
QEM is not responsible for any other expense (included the installation or the removal), drawback, or consequent damage, included injuries to people or damages to properties caused by articles of QEM. In any case, the total obligation of QEM, in all the circumstances, won't exceed the total purchase price of the control.
The claims for the reimbursement of the purchase price, repairs, or substitutions must be reported to QEM with all the data regarding the defect, the purchase date, the job developed by the control and the revealed problem.
Any obligation is not assumed for material of consumption as batteries and fuses.
The commodity must given back only with the written notification, including the Number of Authorization Restitution QEM and all the shipment expenses must be paid.

1.3. Reference manual

Transcript and preserve with care all the parameters related to the setting and planning of the tool with the purpose to facilitate the possible operations of exchange and assistance.

The documentation relative to the QEM tools has been divided in different issues to allow an effective and rapid consultation of the wanted information.

MIM - Base	**MIM-Base: Maintenance and Installation Manual** Hardware and firmware description of the tool.
MIM - Exp	**MIM - Exp: Expansion manual** Hardware information of the expansions linked to the tool.
MDU	**MDU: User Manual** Description of the installed application in the tool.
MIMAT	**MIMAT: Attendance Manual.** Base information about: execution of the wirings, procedures of the calibration, parametrization of the products and the breakdowns locations.

It's possible to download the manuals from the QEM website: *www.qem.it*

1.4. Validity

The present document is valid integrally except errors or omissions.

M: manual
S: tool

Release manual	Description	Data
1.0 1.1 1.2	**M**: New manual **M**: Upgrade **M**: Upgrade	29/09/2006 03/11/2006 26/04/2007

1.4.1. Copyright

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1.5. Norm references

The European norm include some norms and recommendations regarding the aspects relative to the security of the control systems that includes elements of operator interface.

Protection level	IP20 (according to EN 60-5-29)
Frontal protection level	IP62
Vibrations resistance	According to IEC 68-2-6
Collision resistance	According to IEC 68-2-27
Disturbance immunity	According to EN 50082-2
Emission level	According to EN 50081-2

2. Description

J1-255-Dx is an integrated controller of the family product Qmove, characterized by:

2 axes control

1 serial port for programming (PROG port RS232);
1 serial port (RS422 / RS485).

Operative system Real-Time Multitasking QMOS to manage the hardware resources available.

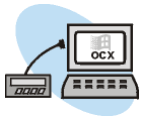
Device provided of solutions ready to use in the development of application of industrial automation.

Functionalities necessary to automate machines and plants:
- PLC (Programmable Logic Controller),
- MC (Motion Controller),
- HMI (Human Machine Interface).

Structured language programming (QCL) or ladder (IEC1131).

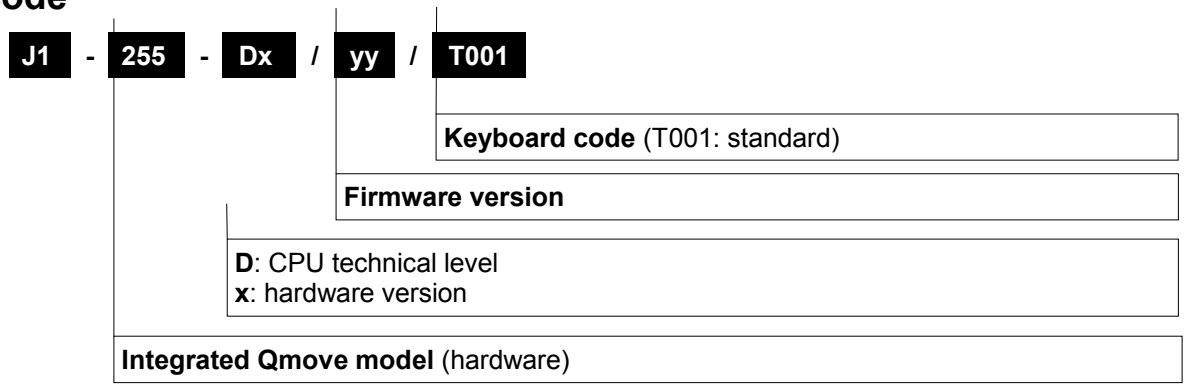
Links to Modbus nets.

Development environments in the applications Qview (MC+ PLC) and Qpaint (HMI) free and without royalties.



Libraries OCX to serial communications with PC in environment Windows®.

2.1. Product code



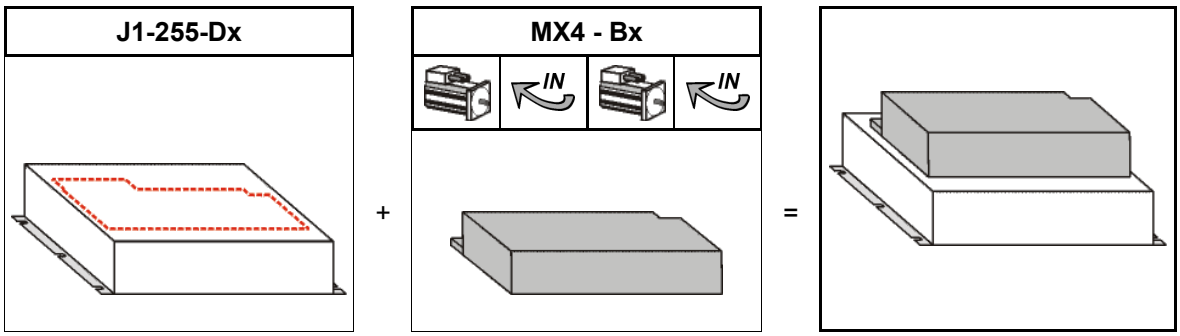
2.1.1. Available models

Model	SIO port	Bidirectional counting 24 Vdc (Push Pull)	Digital output	Digital input	Output +/- 10 V	Serial Port		
						RS232	RS422	RS485
J1-255-DA	2	2 (200Khz)	8	8	2 (16 bit)	1	1	-
J1-255-DB	2	2 (200Khz)	8	8	2 (16 bit)	1	-	1

2.2. Expansion

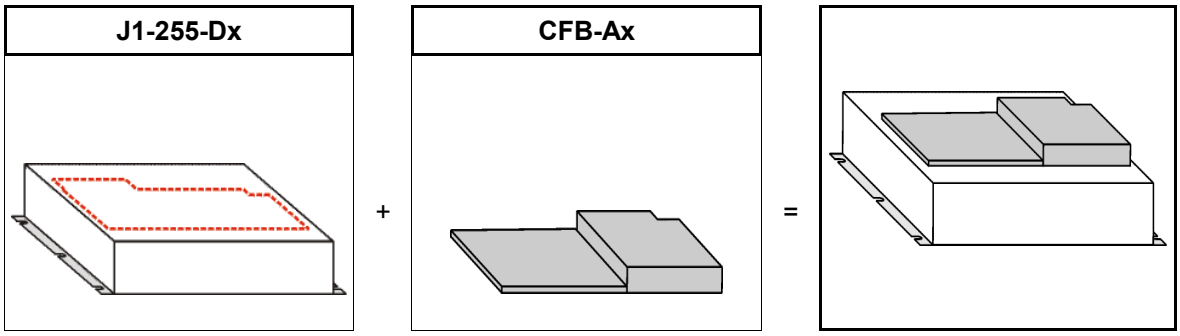
2.2.1. MX4 - Bx: Axes Expansion board

*For further information see the manual **MIM-MX4-Bx** or **MIM-MW4-Bx***



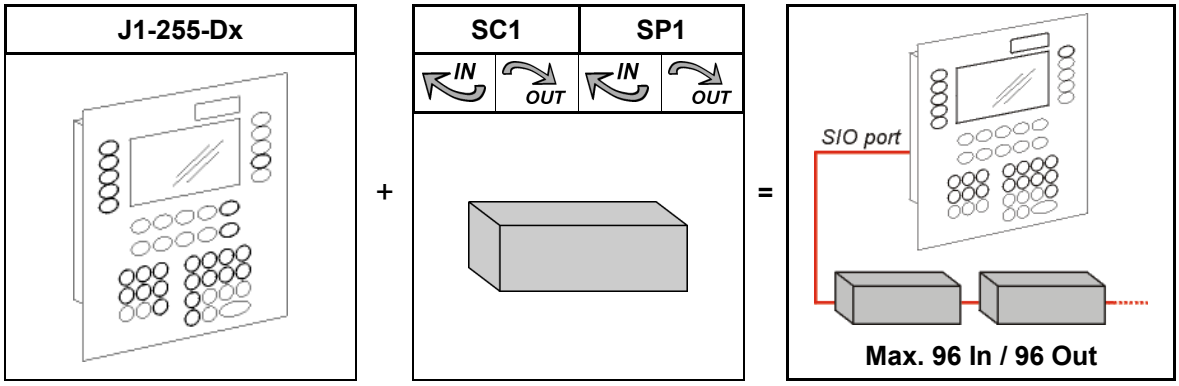
2.2.2. CFB-Ax: Expansion board for PROFIBUS connection

*For further information see the manual **MIM-CFB-AX**.*



2.2.3. SC1, SP1: I/O Expansions

*For further information see the manual **MIM-SC1** or **MIM-SP1**.*

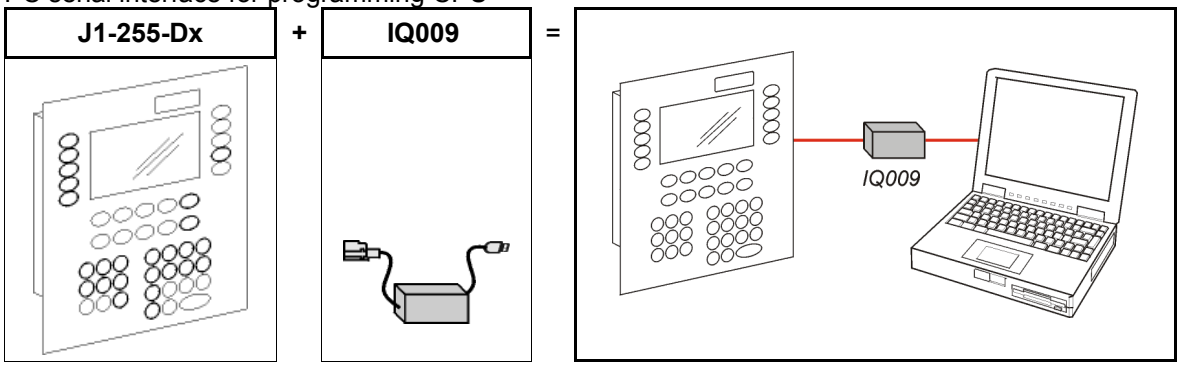


2.3. Accessories

2.3.1. IQ009

*For further information about **IQ009** see the manual **IQ009-Quick-Start.***

PC serial interface for programming CPU

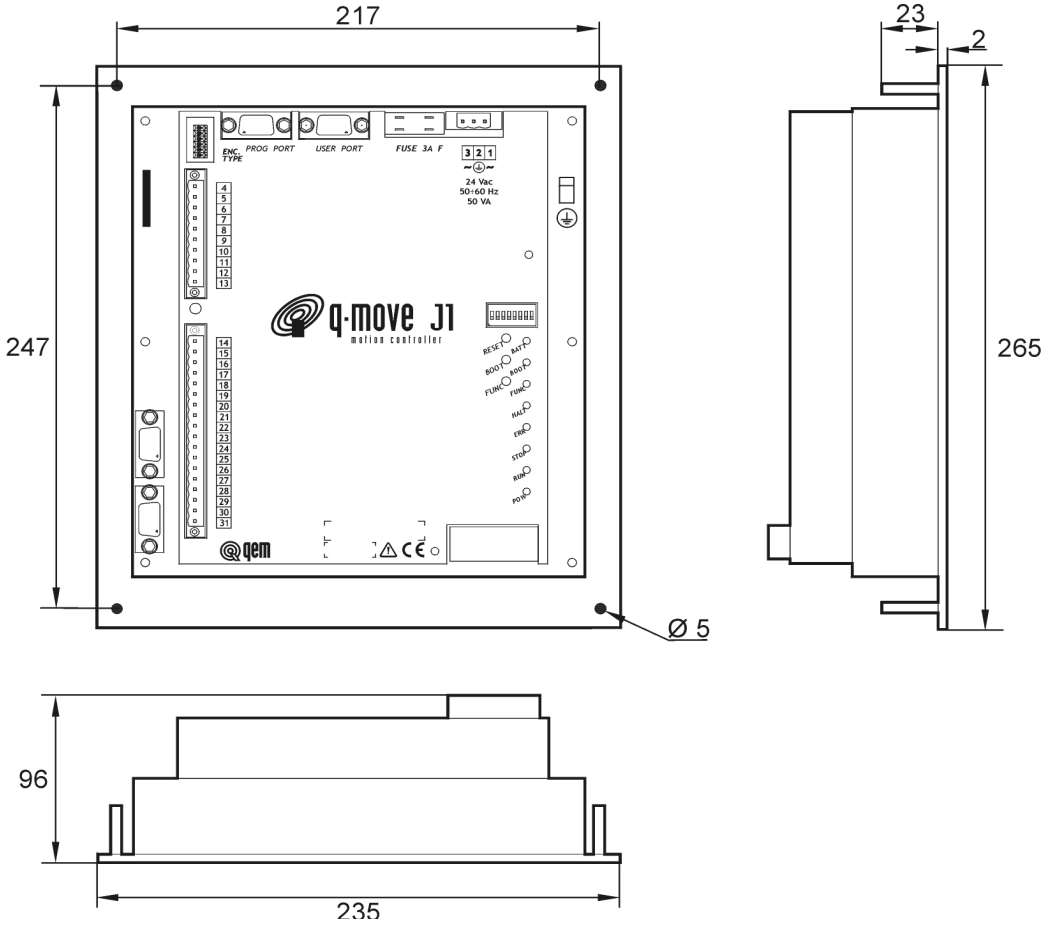


3. Data sheets

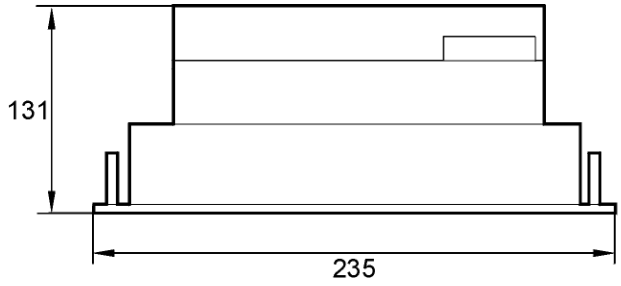
Weight J1-255-Dx (maximum hardware configuration)	5,40	Kg
Weight J1-255-Dx + MX4 (maximum hardware configuration)	6,40	Kg
Material of the container	Stainless steel	
Display	240x128	LCD (blue)
Display area / Diagonal	123x68 mm / 5,4”	
Keys of the system	24	(page 25)
Key of the function	20	(page 26)
Led of the system	4	(page 26)
Led of the function	20	
Led CPU	8	(page 26)
Working temperature	0 ÷ 50	°C
Transportation and storage temperature	-25 ÷ +70	°C
Relative humidity	90%	With no condensation
Altitude	0 - 2000	m a.s.l.
Atmosphere	No corrosive gases	

3.1. Mechanical dimensions

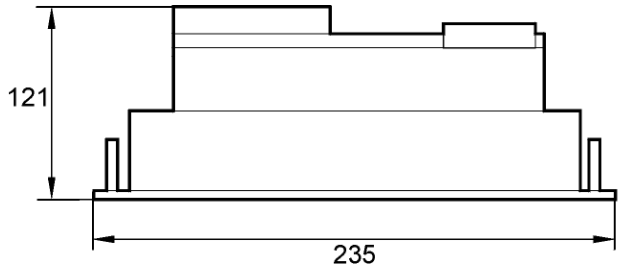
Measures in mm.



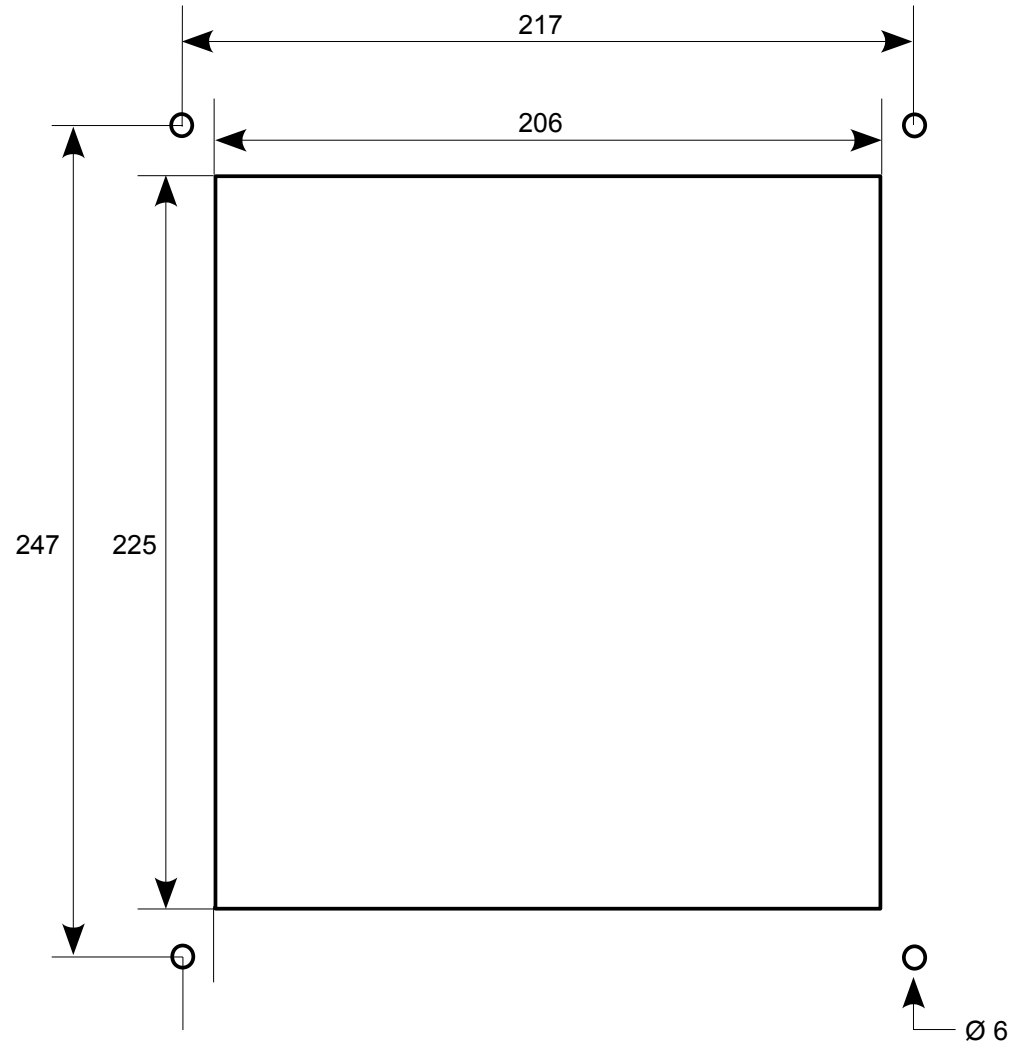
3.1.1. Version with MX4-Bx



3.1.2. Version with CFB-Ax



3.1.3. Perforation area



4. Product conformation

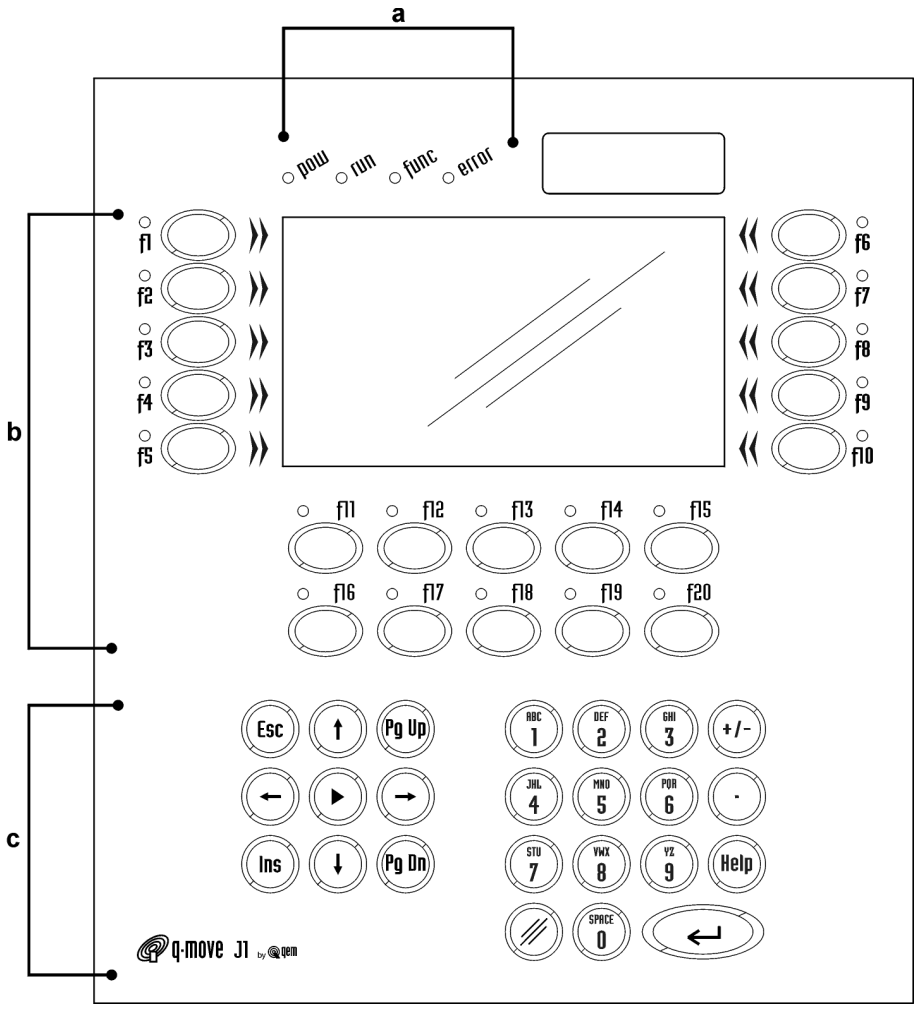
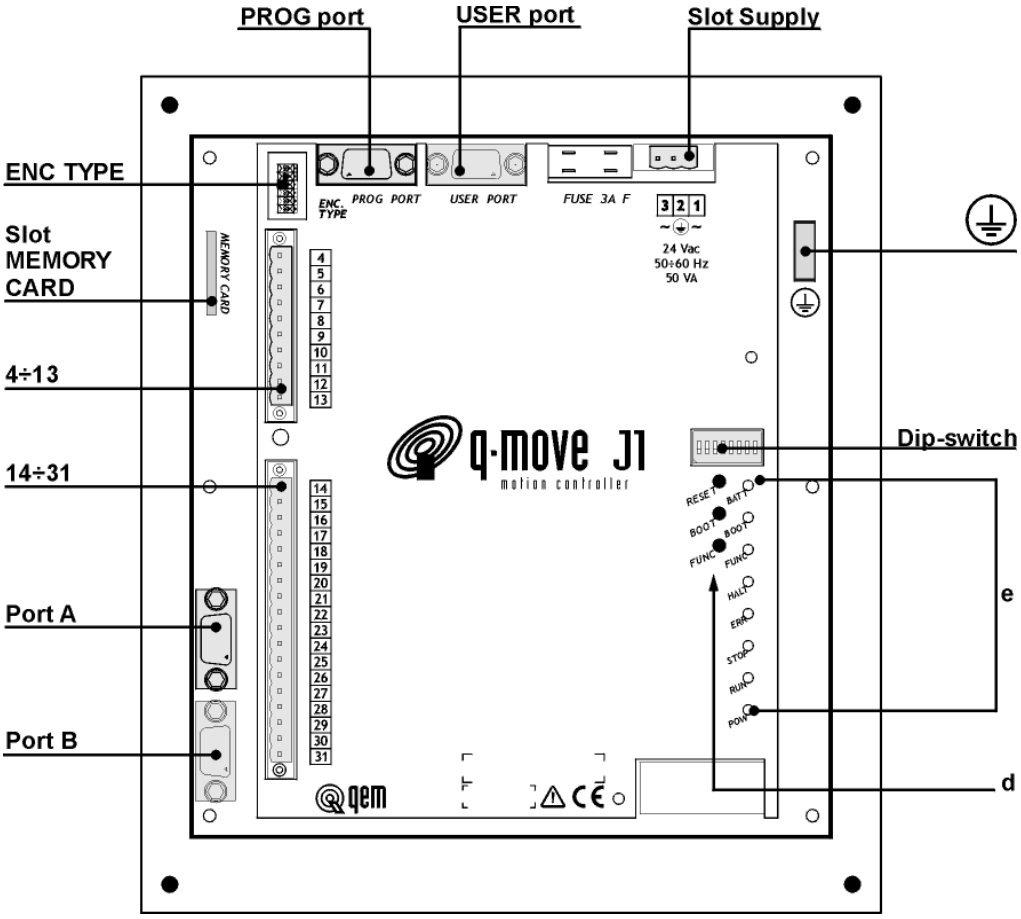


Fig. 1: Frontal view

a) Led system (page 26)
b) Key and Led Function (page 26)
c) Keyboard (page 25)



d) System keys (page 27)
e) Led CPU (page 26)
Dip-switch. Setting USER / PROG port (page 28)
Slot Supply. Supply (page 18)
USER port. Connector for connection to external units (page 19)
PROG port. Connector for communication through PC (page 21)
ENC TYPE. Setting input encoder (page 28)
Slot MEMORY CARD (page)
Slot 2 (4÷13). Input encoder, Analog Output (page 22)
Slot 2 (14÷31). digital input, Digital Output. (page 23)
Slot 3 - Port A Connectors for connection to SIO net. (page 24)
Slot 3 - Port B (page 24)

5. Electrical Specification

*About connections see **Electrical connections** at page 18*

5.1. CPU (technological level D)

*Per further information about the use of the memory see **Information programming** at page 40*

Microprocessor	RISC	(32 bit)
Running frequency	28	MHz
RAM	492	Kb
Serial Flash for backup	256	Kb
Parallel Flash *(Reserved to the application)*	748 (256	Kb Kb)
Memory for the operator interface	256	Kb

5.2. Supply: Power Supply

*For a correct installation of the tool see the manual **MIMAT**.*

Type of supply	24	Vac
Allowable Range	+/- 15 %	
Max absorption	30	VA
Protection through fuse	3	A

5.2.1. Notes for supply

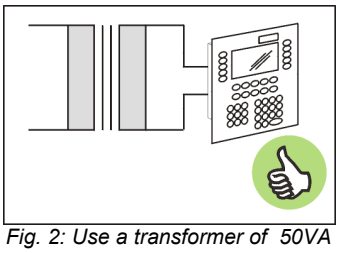


Fig. 2: Use a transformer of 50VA min. sec. 24 Volt

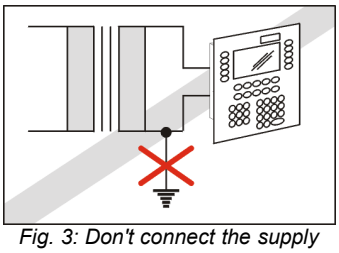


Fig. 3: Don't connect the supply tension to the ground

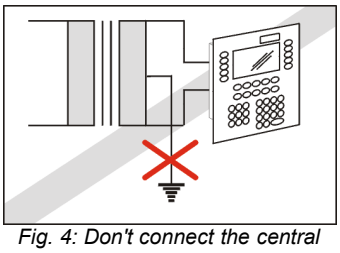


Fig. 4: Don't connect the central body of the transformer to the ground

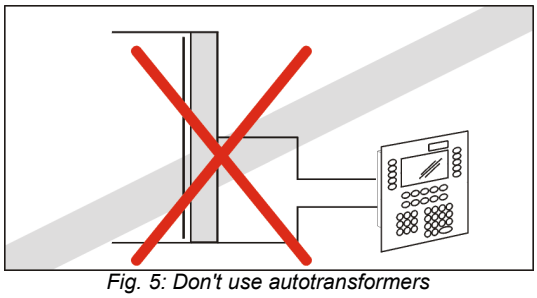


Fig. 5: Don't use autotransformers

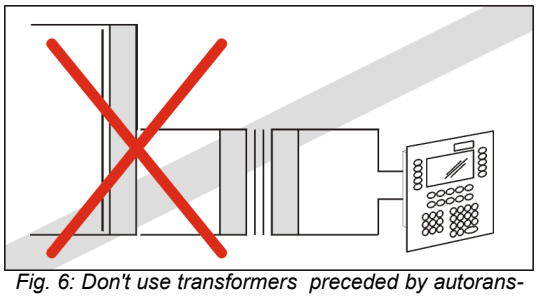


Fig. 6: Don't use transformers preceded by autoransformers

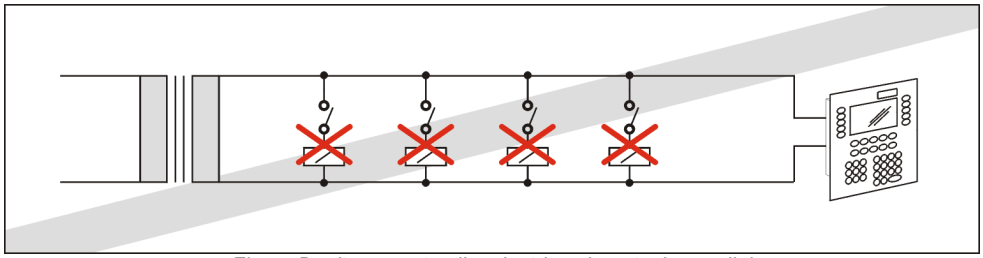


Fig. 7: Don't connect coils, electric valve etc. in parallel

5.3. USER port

Determine the communication speed from ***Procedures and signals settings*** *at page 25*

Electric standard	RS422, RS485
Used protocols	MODBUS: protocols for communication with external units BIN 1: protocol QEM for communication PC with Windows ®
Used devices	Modbus: Management of protocol MODBUS Sercom: Management of protocols for printers, bar code, PLC, HMI,...
Identification USER port from device	1

5.3.1. RS422

Communication speed	19200 / 38400 / 57600 baud
Communication mode	Full duplex
Functioning mode	Differential
Max. number of Driver/Receiver	1 / 10
Max. wire length	1200 m
Input impedance	≥ 12 KΩ
Current limit for short-circuit	≥ 35 mA

5.3.2. RS485

Communication speed	19200 / 38400 / 57600 baud
Communication mode	Half duplex
Functioning mode	Differential
Max. number of Driver/Receiver	32 / 32
Max. wire length	1200 m
Input impedance	≥ 12 KΩ
Current limit for short-circuit	≥ 35 mA

5.4. PROG port

Determine the communication speed from ***Procedures and signals settings at*** *page 25*

Electric standard	RS232
Used protocols	MODBUS: Protocols for communication with external units BIN 1: protocol QEM for communication PC with Windows ®
Used devices	Modbus: Management of protocol MODBUS Sercom: Management protocols for printers, bar code, PLC, HMI,...
Identification USER port from device	0

5.4.1. RS232

Communication speed	19200 / 38400 / 57600 baud
Communication mode	Full duplex
Functioning mode	Referred to GND
Max. number of Driver/Receiver	1 / 1
Max. wire length	15 m
Input impedance	≥ 3 KΩ
Current limit for short-circuit	≥ 7 mA

5.5. PORT A / B (SIO OUT)

For further information see the manual of the remote module to connect.

In any port it's possible to connect until 96 inputs and 96 outputs through remote modules

5.6. Encoder inputs

	Push Pull	Line-Driver
Maximum frequency	250 KHz	
Minimum time from a peak PH A and the next of PH B	1 µs	
Minimum time for acquisition (hardware) of PH Z	5 µs	
Optoinsulation	1500 Vrms	
Nominal working voltage	24 Vdc	3,5 Vdc
Voltage at logic state 0	0 / 1,5 V	0 / 1 V
Voltage at logic state 1	22,5 / 25 V	2,5 / 4,4 V
Internal voltage	1,6 V	
Input resistance	2360 Ω	160 Ω
Maximum cable length for connection to transducer	150 m	

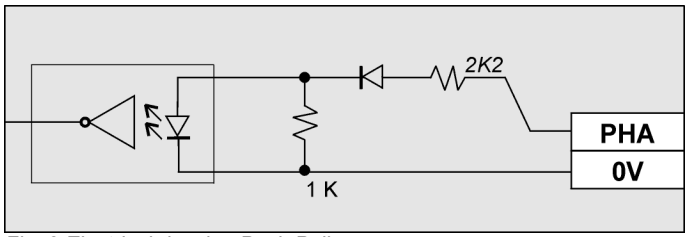


Fig. 8 Electrical drawing Push Pull

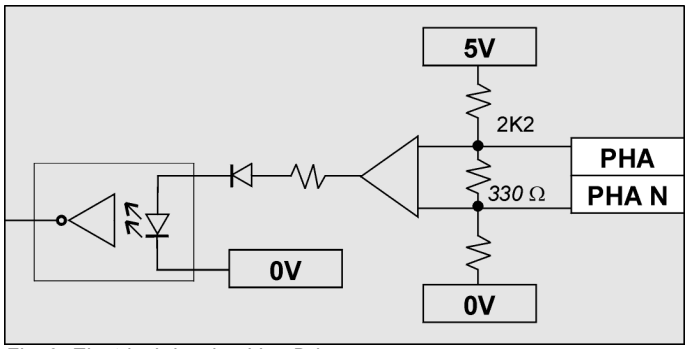


Fig. 9: Electrical drawing Line Driver

5.7. Analog Output

Type of connection	In common mode	
Insulation	1500	Vrms
Voltage range (minimum at open-circuit)	-9,8 / 9,8	V
*Max. variation offset **	+ / - 5	mV
Resolution	16	bit
Maximum current	1	mA
Variation of the output depending on the load	95	µs / µA

** = Depending on the applications it's possible to realize a software compensation of the offset drift*

The hardware offset can be corrected through software, thus the offset voltage is summed algebraically to the analog voltage set without exceeding +/- 10 V.
The thermal drift of the analog output is generally negligible in the use of the output as velocity set point of a driving gear related in space.

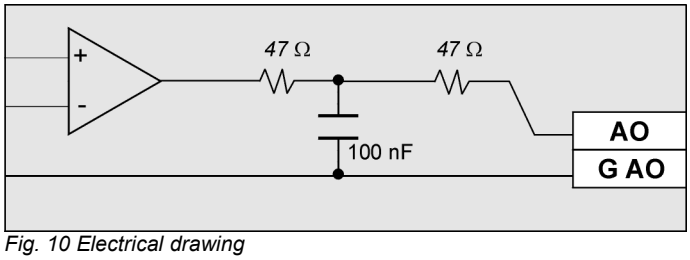


Fig. 10 Electrical drawing

5.8. Digital Input

Type of polarization	NPN / PNP	
Minimum time for acquisition (hardware)	3	ms
Optoinsulation	1500	Vrms
Nominal working voltage	24	Vdc
Voltage at logic state 0	0 / 3	V
Voltage at logic state 1	10,5 / 26,5	V
Internal voltage	1,2	V
Input resistance (Ri)	3300	Ω

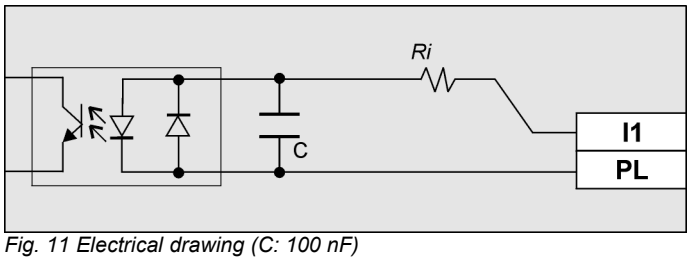


Fig. 11 Electrical drawing (C: 100 nF)

5.9. Digital output

Optoinsulation	1500	Vrms
Switching voltage	AC / DC	(NPN – PNP)
Max. working voltage	24	Vac/dc
Internal voltage	2,5	V
Nominal current	70	mA
Slip current	20	μA
Switching time from ON to OFF	120	μs (max.)
Switching time from OFF to ON	8	μs (max.)

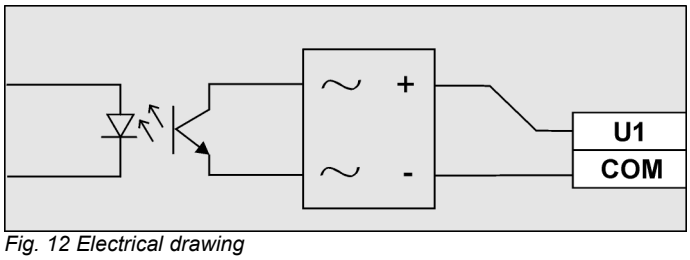


Fig. 12 Electrical drawing

6. Electrical connections

*Before doing connections see the tool characteristics in the chapter **Electrical data sheets** at page.13*

6.1. Supply:

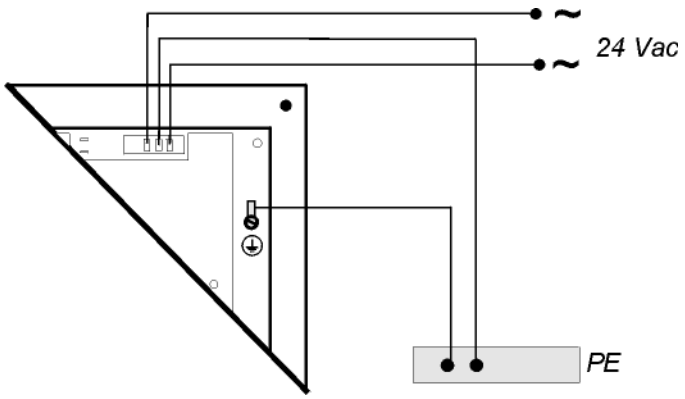
The wiring must be done by specialized staff and provided of the right anti static measures.

Before handling the tool, remove voltage and all the parts connected to it.

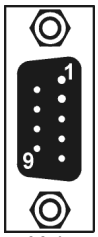
Take both the ground points to the PE bar with two distinct cables using a cable of 2,5 mm q as sections at the connection "faston" and of 1,5 mm q at the other (maximum cable section connectible to the terminal.

To guarantee the respect of the CE norms, the supply tension must have a galvanic insulation of at least 1500 Vac.

Pin	Name	Description
1	Vac	Supply
2	GND	Ground
3	Vac	Supply



6.2. USER port



Male

Pin	RS422 (J1-255-DA)	RS485 (J1-255-DB)
1	-	-
2	-	-
3	-	-
4	-	-
5	GND	GND
6	RX N	B
7	RX	A
8	TX N	-
9	TX	-

Use twisted shielded cable specific for data transmission.

C1*: necessary just with connection to T-line terminals*

Qmove side - 9 pin (female) *terminal side - 15 pin (female)*

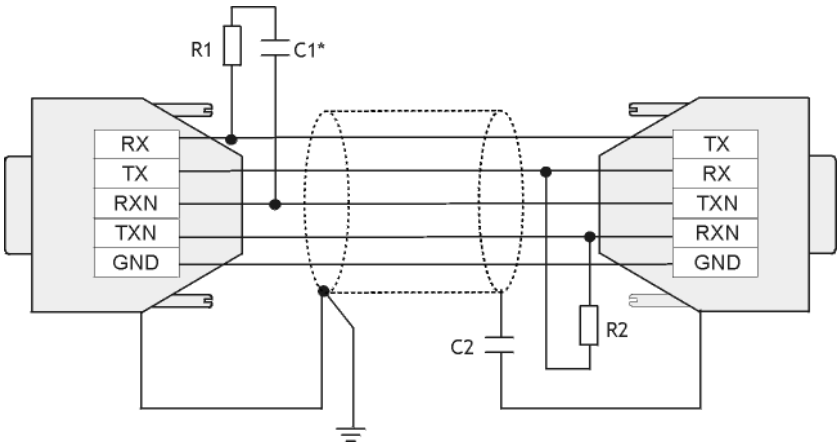


Fig. 13: Example of connection USER port RS422 to terminal HMI

The connection cable between QMOVE and the terminals (in configuration RS 422) must be executed as in figure; the values of the components (R1, C1, R2, C2) varies depending on the cable length.

Cable length	< 2.5 m	>25 m e < 15 m	>15 m
R1	Not connected	120 Ω	120 Ω
C1	Not connected	1 nF	50pF / m length
R2	120 Ω	120 Ω	120 Ω
C2	Not connected	Not connected	10 nF ÷ 100 nF type Y1 o Y2 that supports right voltage transistors (250 Vac working and 500 V impulsive)

Use twisted shielded cable specific for data transmission.

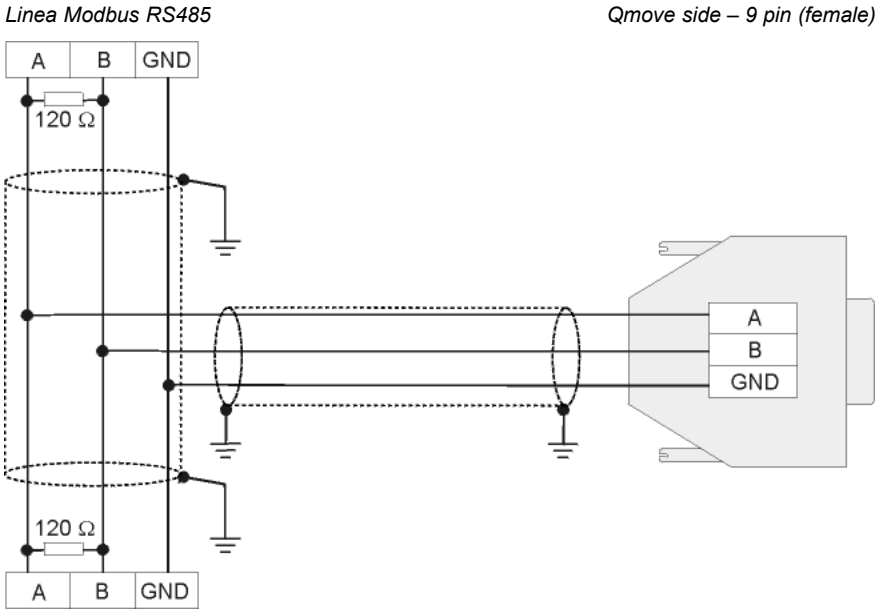


Fig. 14: Connection to Modbus net with USER port RS485

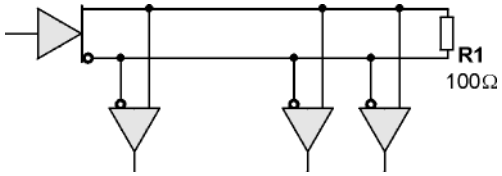
It's possible to realize Modbus net till a maximum of 32 users in total (1 master + 31 slave) without necessity to repeat the signals.
For a proper working of the communication it's necessary to insert some termination resistances of 120 Ωαμονγπαερμαλσ A and B at the beginning and at the end of the connection line.

6.2.1. Connection specifications

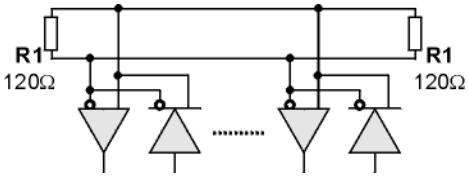
Always connect the termination resistance at the end of the transmission line.

Connect the GND of all devices at a unique conductor to limit the voltage differences for common mode.

RS422



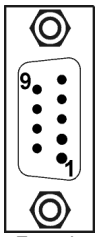
RS485



Description	1 transmitter till 10 receivers	Till 32 transmitters / receivers
Maximum tension in common mode	From -7V to + 7V	From -7V to +12V
Input impedance of the receiver	4 KΩ	12 KΩ
Minimum load on the transducer	100 KΩ	60 Ω
Minimum load on the transducer	From <150 mA to GND	From <250 mA to -7V / +12 V

Transmission speed	9600 baud	19200 baud	38400 baud	57600 baud
Maximum cable capacity	30 nF	15 nF	0,75 nF	0,5 nF

6.3. PROG port



Female

Pin	Name
1	-
2	RX
3	TX
4	-
5	GND
6	-
7	-
8	-
9	-

Use twisted shielded cable specific for data transmission.

The cable length can be greater than 15mt.

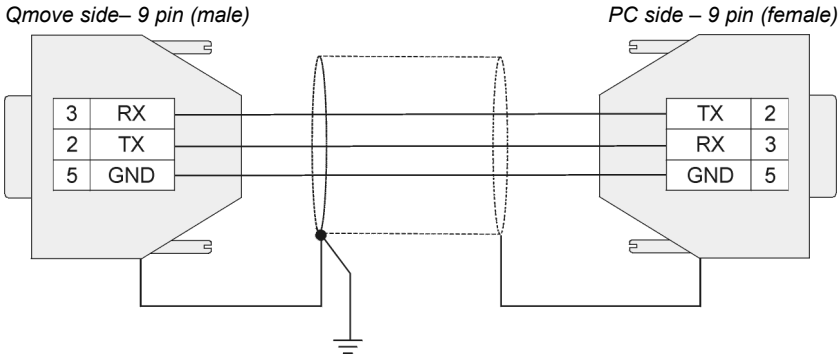
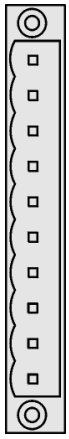
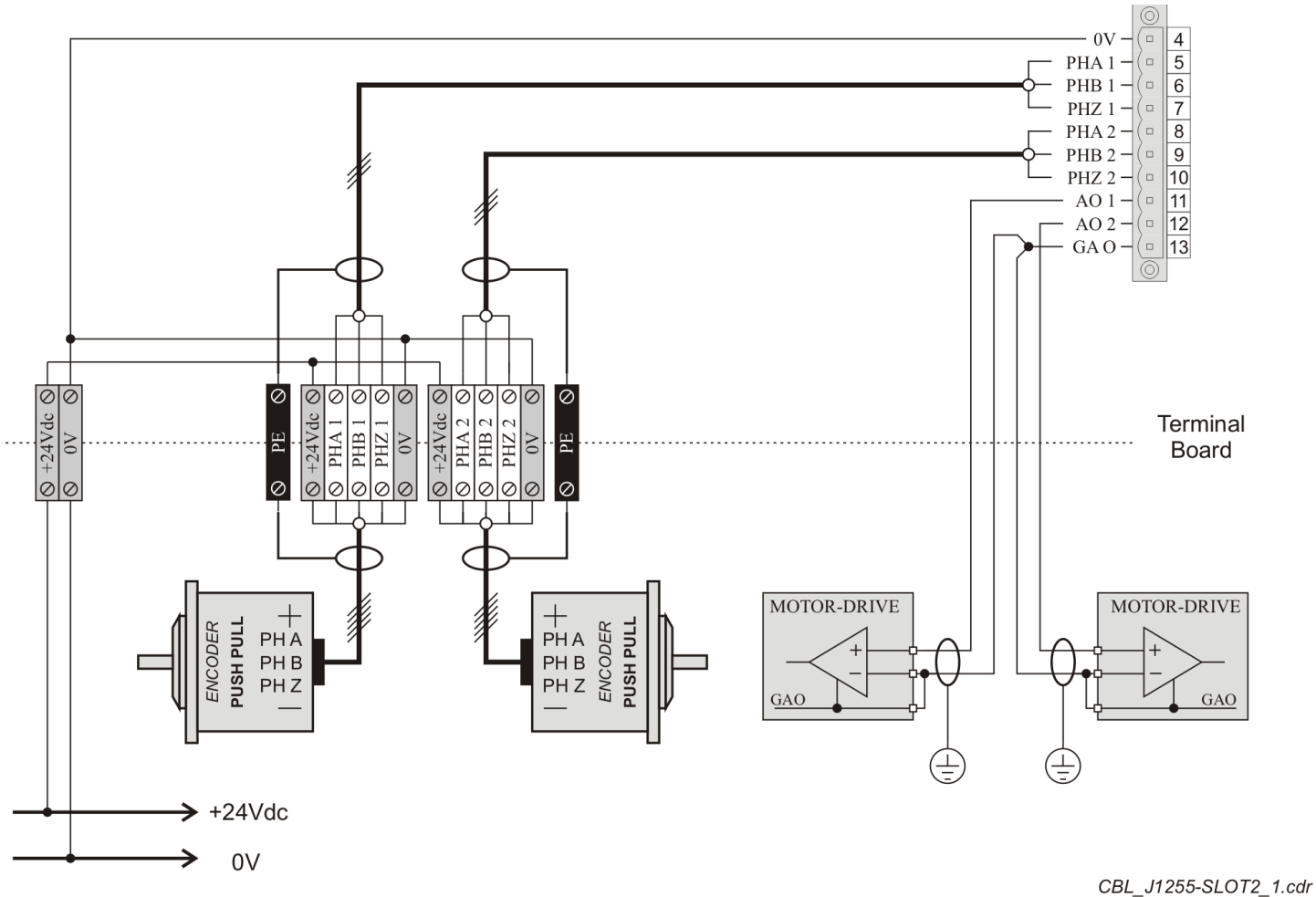


Fig. 15: Connection PROG port RS232 to PC

6.4. Slot 2 (4÷13): Encoder input, Analog Output



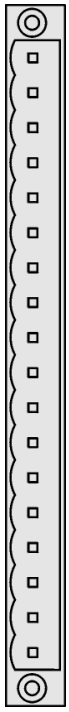
Pin	Name	Description	Address
4	0V	-	-
5	PHA 1	Encoder 1	2.CNT01
6	PHB 1		2.CNT01
7	PHZ 1		2.INZ01
8	PHA 2	Encoder 2	2.CNT02
9	PHB 2		2.CNT02
10	PHZ 2		2.INZ02
11	AO 1	Analog Output	2.AN01
12	AO 2		2.AN02
13	G AO	Common AO 1 ÷ AO 2	-



CBL_J1255-SLOT2_1.cdr

Fig. 16: Example of connection SLOT 2 (4÷13)

6.5. Slot 2 (14÷31): Digital input, Digital output



Pin	Nome	Description	Address
14	PL	Polarization I1÷I8	-
15	I1	Digital input	2.INP01
16	I2		2.INP02
17	I3		2.INP03
18	I4		2.INP04
19	I5		2.INP05
20	I6		2.INP06
21	I7		2.INP07
22	I8		2.INP08
23	COM	Common O1÷O8	-
24	O1	Digital output	2.OUT01
25	O2		2.OUT02
26	O3		2.OUT03
27	O4		2.OUT04
28	O5		2.OUT05
29	O6		2.OUT06
30	O7		2.OUT07
31	O8		2.OUT08

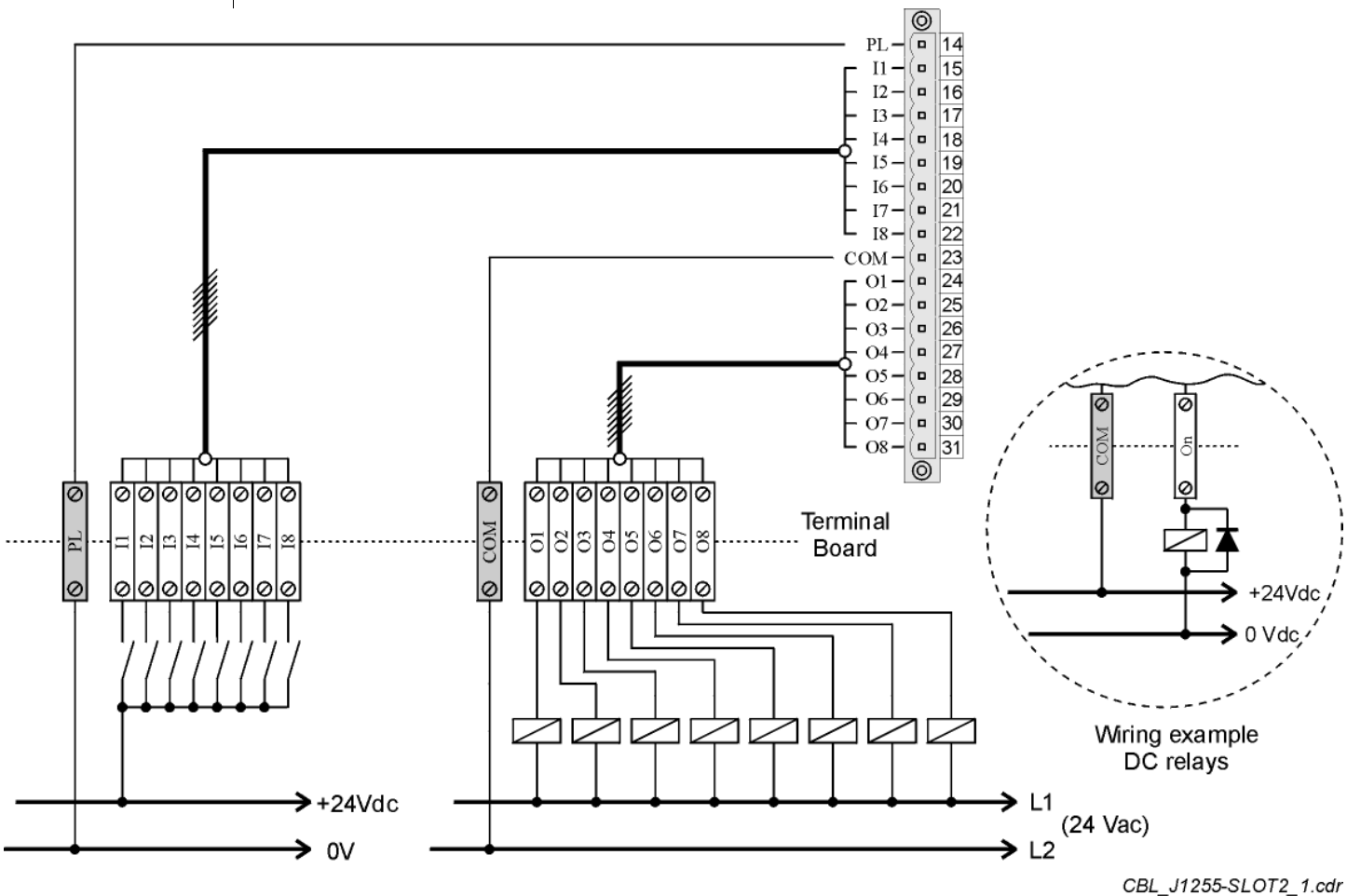
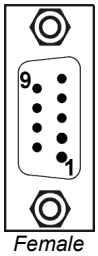


Fig. 17: Example of connection SLOT 2 (14÷31)

6.6. Slot 3: Port A

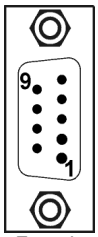
Use twisted shielded cable specific for data transmission.



Female

Pin	Name
1	CLK
2	LTC
3	DIN
4	DO
5	GND
6	CLK N
7	LTC N
8	DIN N
9	DO N

6.7. Slot 4: Port B



Female

Pin	Nome
1	CLK
2	LTC
3	DIN
4	DO
5	GND
6	CLK N
7	LTC N
8	DIN N
9	DO N

Use twisted shielded cable specific for data transmission.

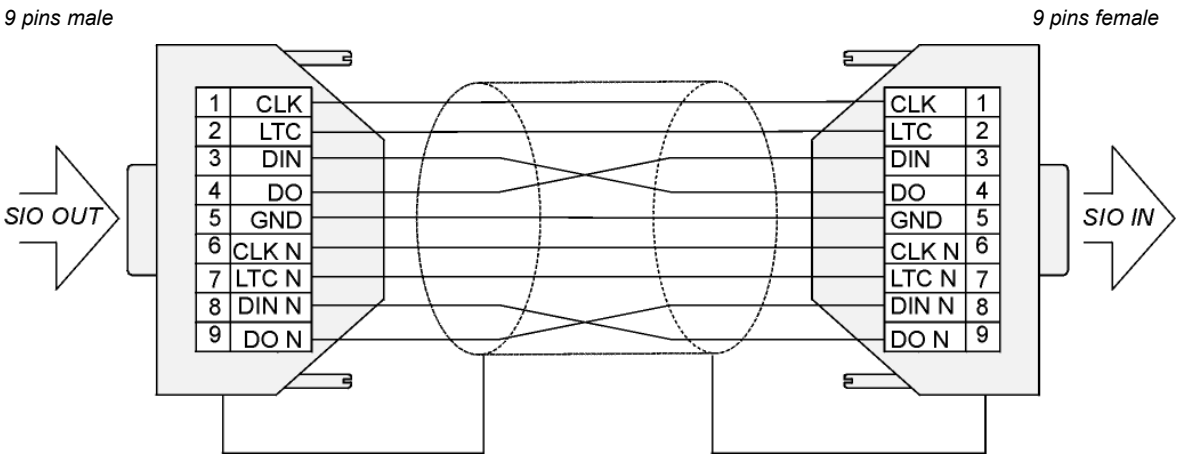


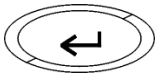
Fig. 18: Connection Port B(A) to SIO net

7. Settings, procedures and signals

7.1. Keys

The functioning of these keys is different depending on the state of the terminal:
- **normal functioning** all the keys are programmable.
- **data-entry** the keys assume a precise working.

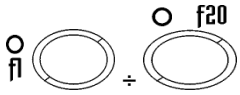
7.1.1. Keyboard

Key	Normal Functioning	Data-entry
(1)	Programmable	Exit from data-entry without saving
	Begin data entry by default (2)	-
	Programmable	Enable data entry on the previous object
	Programmable	Enable data entry on the following object
	Programmable	Enable data entry on the following object
	Programmable	Enable data entry on the previous object
	Programmable	Data type: **Alphanumeric Value:** next-char-entry (at right) **Valstring e Valimage:** pressed for less than 500msec you pass to the next message, pressed for more than 500msec you pass to the previous message.
	Go to the next page (2)	-
	Go to the previous page (2)	-
	Programmable	Entry of numbers or chars
	Programmable	Modifies the sign (if enabled)
	Programmable	Introduce the decimal point (if enabled)
	Programmable	-
	Programmable	Cancel the last data entered. Pressed for 1 sec. Cancels all the value
	Programmable	Confirm the data entered and pass to the next field.

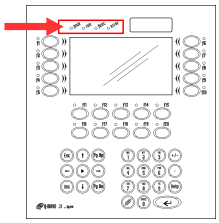
(1) ESC = Just during the password entry this key cancel the function of introduction and goes back to the previous page.

(2) Modifiable functioning if it's defined a page event on the same key.

7.1.2. Function keys

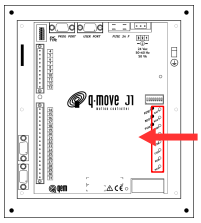
Keys	Normal Functioning	Data-entry
	Programmables	-

7.2. Led



7.2.1. System led

Name	Description
pow Green	ON: Tool supplied
run Green	ON: Tool in RUN
	BLINK: Tool in READY
func Green	ON: Waiting for execution “System functions”.
error Red	ON: Errors
	BLINK: The number of flashing indicates the type of error

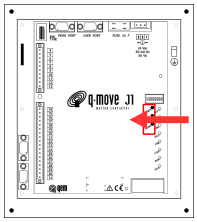


7.2.2. Led CPU

Name	Description
BATT Red	Substitute the battery
BOOT Yellow	There's no a proper operative system for the CPU working.
FUNC Green	CPU is going to do the system functions recallable through the keys.
HALT Red	The CPU manage the abnormal situations that may happen and that could take to system malfunctioning. These situation can be intercepted from the firmware which enables this led and stops every activity. The boards in the bus are disabled. At the new system turning on, the board works normally, and the led flashes till the procedure of **Reset signaling halt** (**System functions** at page. 31)

Name	Description			
ERR Red	Error. The number of flashes indicates the type of error.			
			Description	***Solution***
	n. 1	**Bus error**	Bus not configured as described in the application.	**Correct the transfer software,** or contact your furnisher.
	n. 2	**Check Sum Error**	Data recorded in FerRAM are altered	To turn the alarm off do the procedure of ***Reset error signal*** or ***System functions > Restore application*** at page. 31
	n. 3	**Index Out of Bound**	Array index is on a non-existent element.	**Problem due to the transferred software.** Turn off and then turn on the instrument, if the problem persists contact your furnisher.
	n. 4	**Program Over Range**	The index of program selection inside the DATAGROUP tried to access to a non-existent program.	
	n. 5	**Step Over Range**		
	n. 6	**Division By Zero**	The denominator of a division operation is zero	
	n. 7	**Syntax Error**	The application has a non-valid instruction.	**Problem in the tracing of the software**, application not noticed in phase of compiling.
	n. 8	**Watchdog Error**	The smart board on the bus doesn't work properly.	Contact your furnisher for the substitution of the hardware breakdown.
	n. 9	**Stack Error**	The application met a jump instruction to a not allowed subroutine.	**Problem in the tracing of the software**, application not noticed in phase of compiling. QEM remind that a sub-routine can't call to other sub-routine for more than 5 levels.
STOP Yellow	CPU in STOP state			
RUN Green	ON: CPU in RUN state BLINK: CPU in READY state			
POW Green	Instrument power supplied			

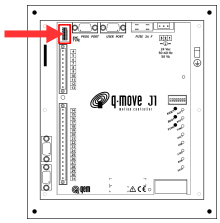
7.3. System keys



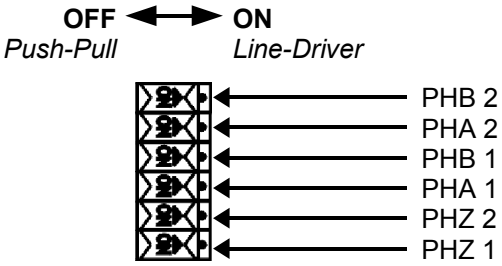
The keys must be used just in case of necessity and never used during the normal working of the machine.

Name	Description
RESET	La CPU is restarted as at the turning on of the instrument.
BOOT	Confirms the system functions selected through the key FUNC.
FUNC	Manual access to the ***System functions.***

7.4. ENC. TYPE



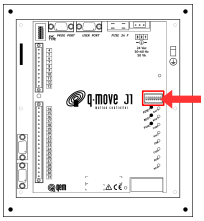
Encoder Input setting in Line-Driver (ON) or Push Pull (OFF).



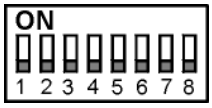
Before supplying the transducer assures the correct setting of the jumpers to avoid the risk of damaging irreversibly the tool.

It's possible to select different functioning levels among the counting inputs and the input relatives to the zero pulse to use them as input in generic interrupt.

7.5. Dip-switch



Setting the PROG/USER port speed.



	Number	Function			
PROG port	**1**	OFF	ON	OFF	ON
	2	OFF	OFF	ON	ON
		Baud-Rate: 38400	*Baud-Rate: 19200*	*Baud-Rate: /*	*Baud-Rate: 57600*
USER port	**3**	OFF	ON	OFF	ON
	4	OFF	OFF	ON	ON
		Baud-Rate: 38400	*Baud-Rate: 19200*	*Baud-Rate: /*	*Baud-Rate: 57600*
-	**5**	-			
PROG port	**6**	OFF	Application debug and development		
		ON	Connection to a HMI terminal, or used by a device that manage the serial connection (MODBUS o SERCOM)		
USER port	**7**	OFF	Serial protocol ASC2		
		ON	Serial protocol BIN1		

7.6. CPU States

Legend:

Led ON

Led OFF

Led flashing

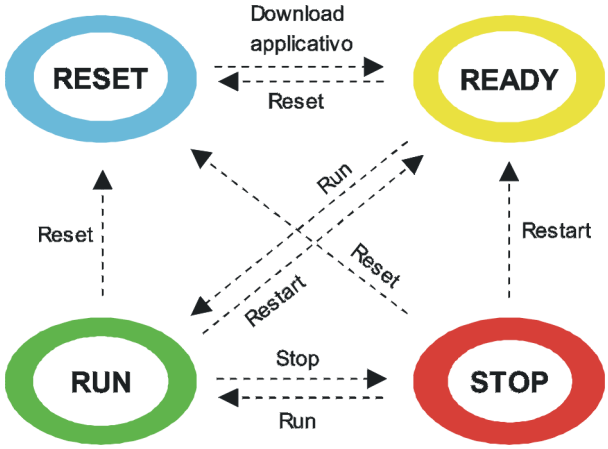


*Fig. 19 Events of the CPU that determines the transition from a state to another. **Run**, **Reset**, **Stop** and **Restart** represents the serial commands that can normally be sent from the development environment. **Download applicative** represents the procedure that allows to transfer the application to the CPU.*

7.6.1. Reset

Led state	POW STOP RUN
Cause state	No application.
Conditions that may take the CPU to this state	At the start up the application in the memory is missing.
	At the start up there's a checksum error (led ERR is flashing).
	Serial command of RESET.
	Exceptional event (led HALT is flashing).

The operative system in this state processes just the serial calls to the port PROG.

From this condition you can pass just to a READY state doing:
- Command of Reset error signal from serial or with the key FUNC;
- Download of the application;
- Application restore with the key FUNC.

7.6.2. Ready

Led state	POW RUN
Cause state	Valid application waiting for running.
Conditions that may take the CPU to this state	Application RESTORE command from serial or with the taste FUNC.
	Application download.

From this condition you can pass to RUN or RESET state.

7.6.3. Run

Led state	POW RUN
Cause state	Application running.
Conditions that may take the CPU to this state	At the start up there's an application in memory.
	Command RUN from serial.

From this condition you can pass tom all the other states of the CPU.

Legend:

Led ON

Led OFF

Led flashing

7.6.4. Stop

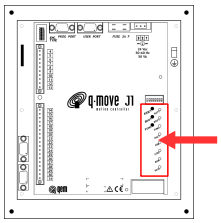
Led state	
Cause state	Stop the application running.
Conditions that may take the CPU to this state	Send the serial command STOP.
	Send the serial command STEP.
	Send the serial command STEP-OVER.
	There's a breakpoint in the interpretation of the application code

From this condition you can pass to all the other states of the CPU.

7.6.5. Summarizing table of the CPU states

State	CPU	Int. board	BUS	Signaling
No application	RESET	OFF	RESET	
Download completed	READY	OFF>TEST>RUN	RESET>ON	
RUN command	RUN	RUN	OK	
STOP command	STOP	RUN	OK	
RESTART command	READY	OFF>TEST>RUN	RESET>ON	
RESET command	RESET	>OFF	>RESET	
Err. Config. BUS	READY	OFF	RESET	
Watchdog board	READY	OFF	>RESET	
Watchdog task	RUN	NO CHANGE	NO CHANGE	NO CHANGE
Checksum error	RESET	OFF	RESET	
Fatal Error	RESET	OFF	RESET	

7.7. System functions



The keys are placed on the back of the instrument because they're intended to the use of experts users and never during the normal running

Legend:

Led ON

Led OFF

Led flashing

To access to the **System functions** turn the instrument on pressing the **FUNC key**;

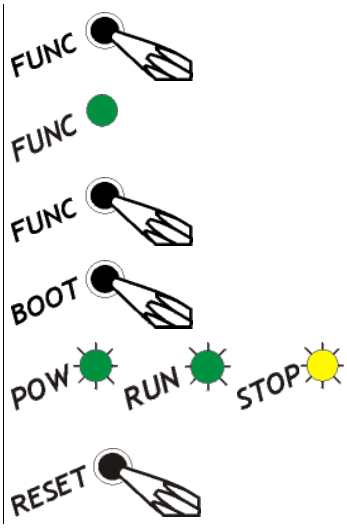
The **FUNC led** indicates that the system functions are available;

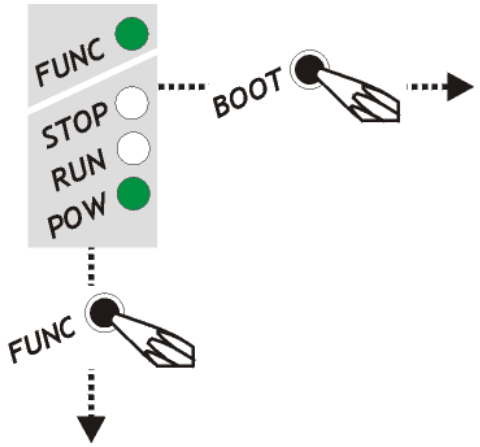
To scroll the functions press the **FUNC key**;

To execute the function press the **BOOT key** (x 2 sec.)

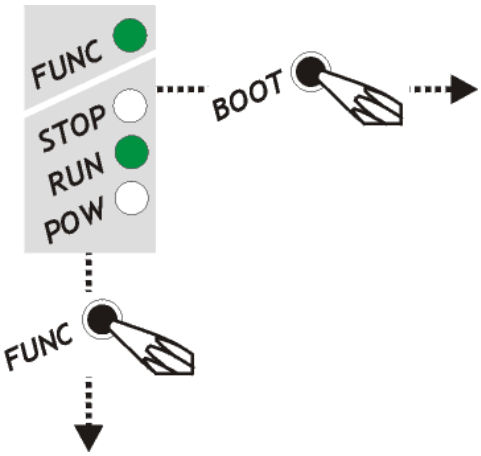
The execution of a function is signaled from the **POW, RUN, STOP led** that flashes depending of the percentage of function completion (20% = 1 led, 40% = 2 led, etc.)

To exit from the system functions press the **RESET key**.

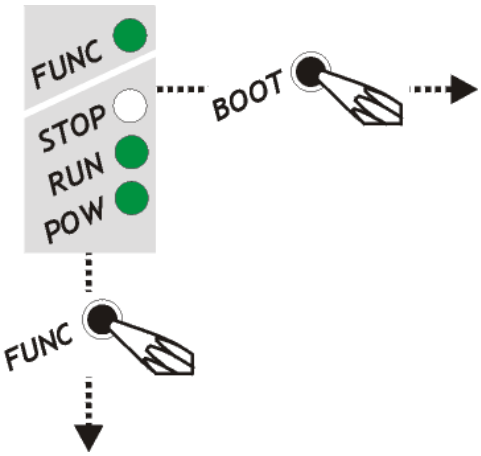




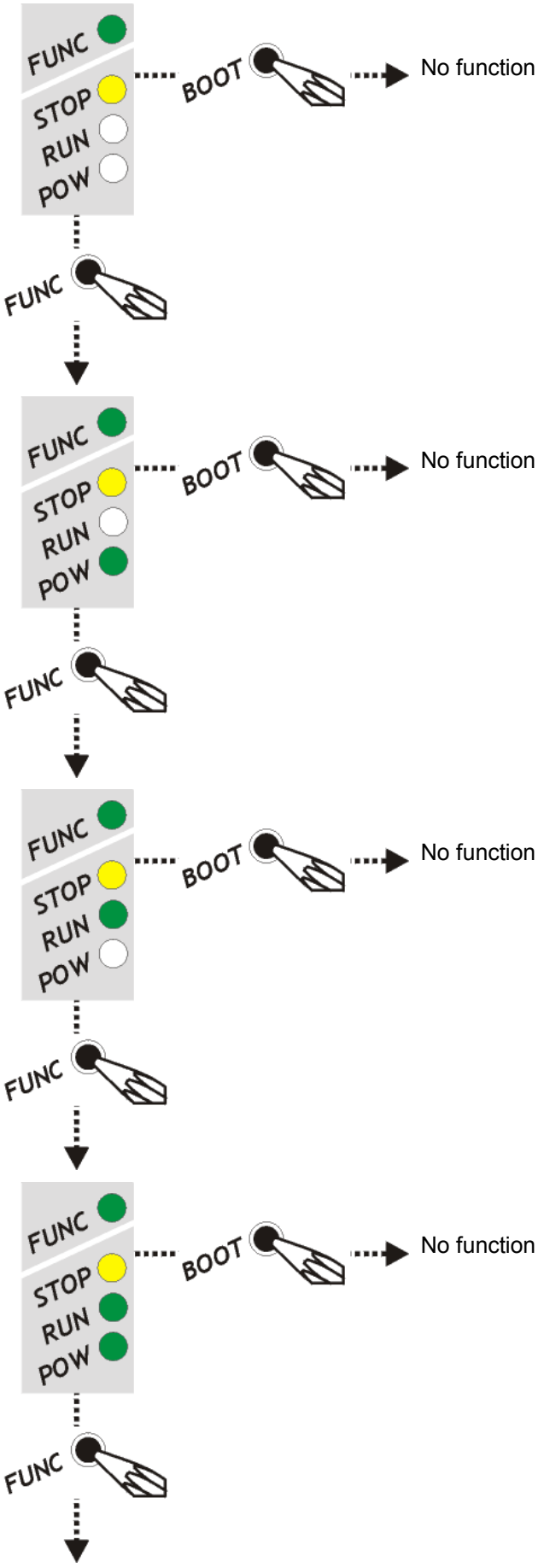
Reset error signal (Checksum error)
*If the **BATT led** is on it's not possible to execute the function.* *If the **BOOT led** is on it's possible to execute the function.*
It's used to force the execution of the software by the CPU although an error signal (ERR led) appeared during the start up phase. Once restored the application, control and confirm all the data.



Data restore
*If the **BOOT led** is on it's possible to execute the function.*
Restore the retentive data memorized with a backup in the not-erasable memory of the instrument (Flash – EPROM). *Proceed with the operation just after a **Backup** (page 38)*



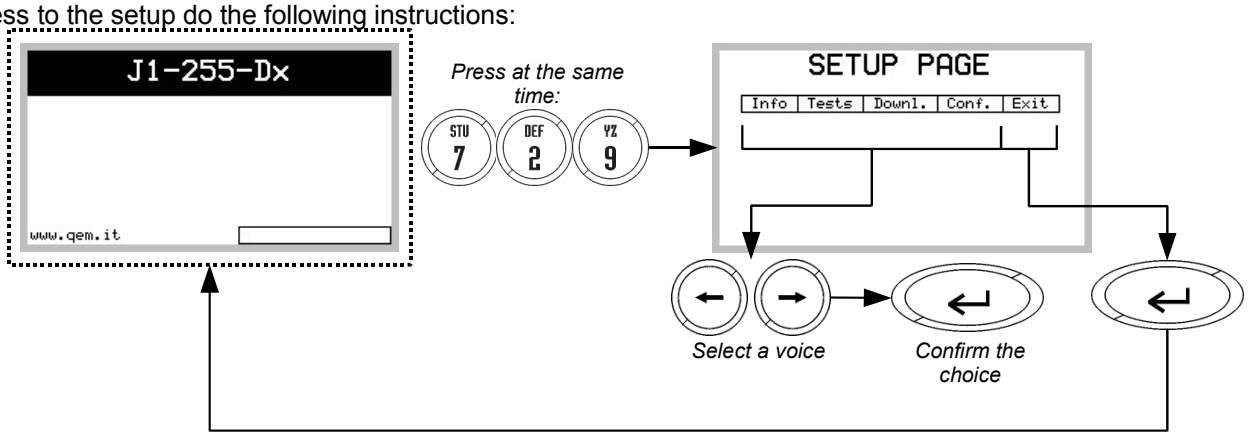
Reset HALT signal
The function erase the signaling of the HALT led.



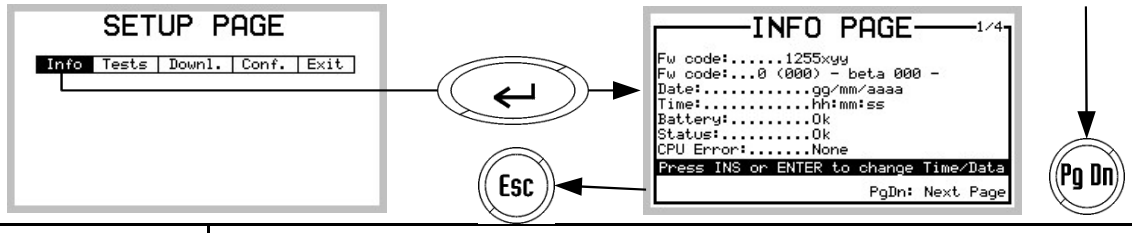
Go back to the initial function

7.8. SETUP PAGE

To access to the setup do the following instructions:

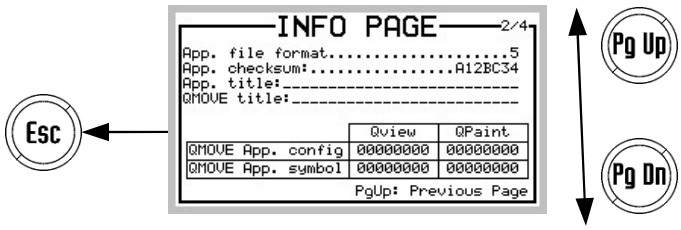


7.8.1. SETUP PAGE > *Info*

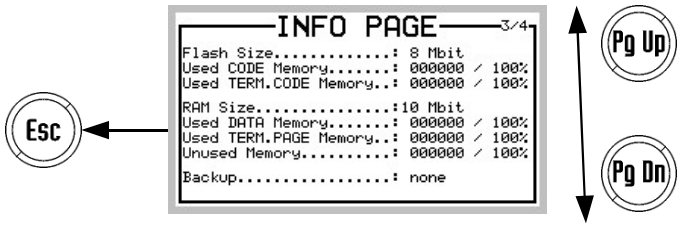


Parameter	Description
Fw Code	Firmware code
Fw Release	Firmware release
Data (dd/mm/yyyy). Time (hh:mm:ss)	To modify the data: - select the data with ↵; - scroll the value with ↑ ↓; - confirm with ↵.
Battery	Battery status that supplies the memory/calendar (timekeeper). In the memory there are the configuration parameters of the terminal as the language of messages and the level of contrast. Messages: - **Ok** - **Low** - **Down**: discharged battery to substitute. The data in the RAM memory will be lost, so you'll have to set the language, the contrast, the time and the data again.
Status	Status of the terminal: - **Ok** - **No match**: the application built for the terminal with QPaint is not compatible with the one realized in the Qview, so a communication between these two applications is not established because it could generate incompatibility in the data of the system. With Pg Dn you can read the checksum relative to QMOVE and the application for which the terminal is programmed. - **Backup error:** the operation of backup didn't work (for the conditions of execution ***Backup*** see page 38). - **Restore Error:** the operation of restore didn't work (for the conditions of execution ***Restore*** see page 38).
Internal Error:	problem internal to the CPU**.** To resolve: -press Help + ///

Parameter	Description
CPU Error	System error signaled by the ERR led, flashing on the back side of the instrument (see ***CPU Led > Err*** at page 26)



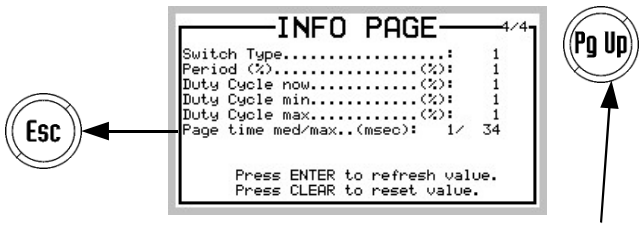
Parameter	Description
App. file format	Identify the file format of the application Qpaint. Forbid the execution of applications with a format not compatible with the firmware.
App. checksum	Identify unequivocally a certain application QPaint. It's executed the calculus about the information used in the download of the application.
App. title	String Qpaint that identifies the application (not modifiable).
Qmove title	Title of the application Qview. Information revealed by the CPU.
Table	Visualize the checksum configuration and the symbols of the application and the file symbol with which the application was generated. **1° value** is read directly from the CPU, **2° value** is contained in the data of download. If the checksum don't coincide, the connection between the terminal and the variables of the Qmove aren't enabled. (see ***Status > No match*** page 33).



Parameter	Description
Flash Size	FLASH memory dimension
Used CODE Memory	QCL code engaged in the FLASH memory
User TERM. CODE Memory	QPaint project engaged in the FLASH memory. (Value shown in the ***Download***)

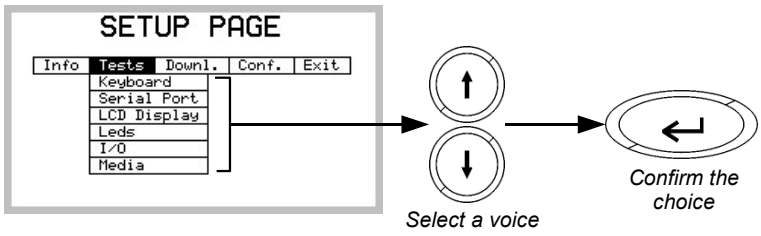
RAM size	RAM memory dimension
Used DATA Memory	Data engaged in the RAM memory
User TERM. PAGE Memory	RAM memory engaged by the current page shown from the terminal before the Set up access.
Unused Memory	Percentage of free RAM memory

Backup	**None**: no valid backup **Done**: backup completed and valid



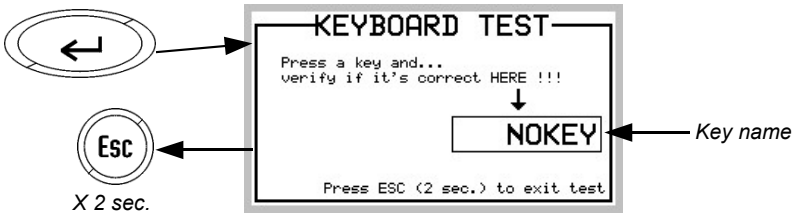
Parameter	Description
Switch Type	System variables > sys001 (page 41)
Period (%)	System variables > sys002 (page 41)
Duty cycle now (%)	Duty cycle in use. System variables > sys003 (page 41)
Duty cycle min. (%)	Minimum Duty cycle
Duty cycle max. (%)	Maximum Duty cycle
Page time (msec.)	Time to refresh pages

7.8.2. SETUP PAGE > Tests



7.8.2.1. SETUP PAGE > Tests > Keyboard

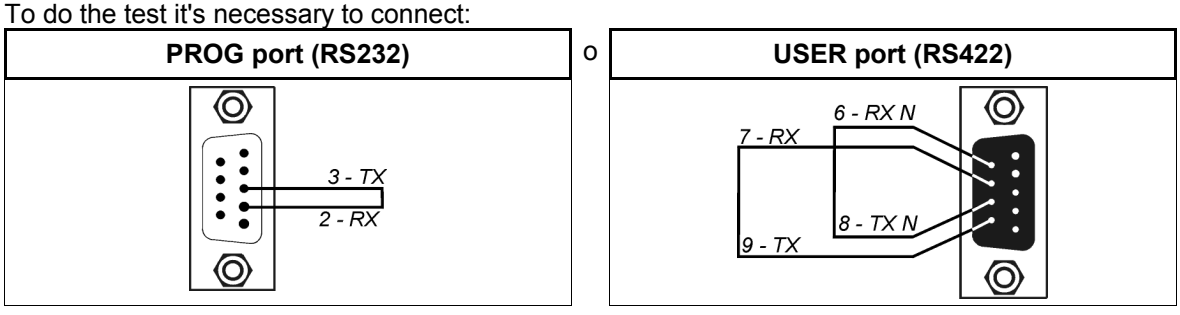
Test verifies the keys working. At the pressure of each key the relative name is shown.



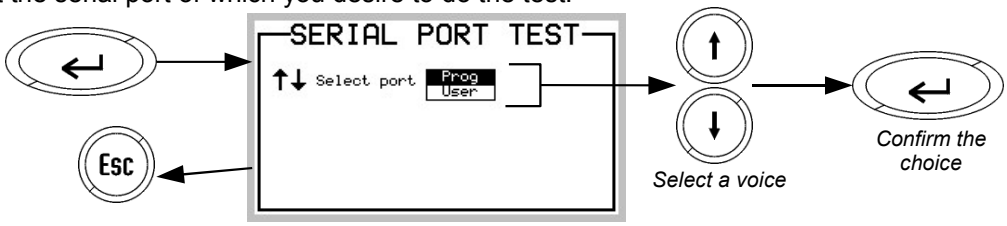
7.8.2.2. SETUP PAGE> Tests > Serial Port

To do the test it's necessary to connect:

The test doesn't work for USER port RS485.



Select the serial port of which you desire to do the test.



After the confirmation with ENTER, the ASCII chars from 0 to 255 will be sent (or shown) in sequence, checking that each of them is received.

In case the communication would stops, the last char sent and the last char received will be shown.

7.8.2.3. SETUP PAGE > Tests > LCD Display

Test for display that enables in cascade all the pixels.

7.8.2.4. SETUP PAGE > Tests > Leds

Test for function led that enables them in cascade with a variable frequency.

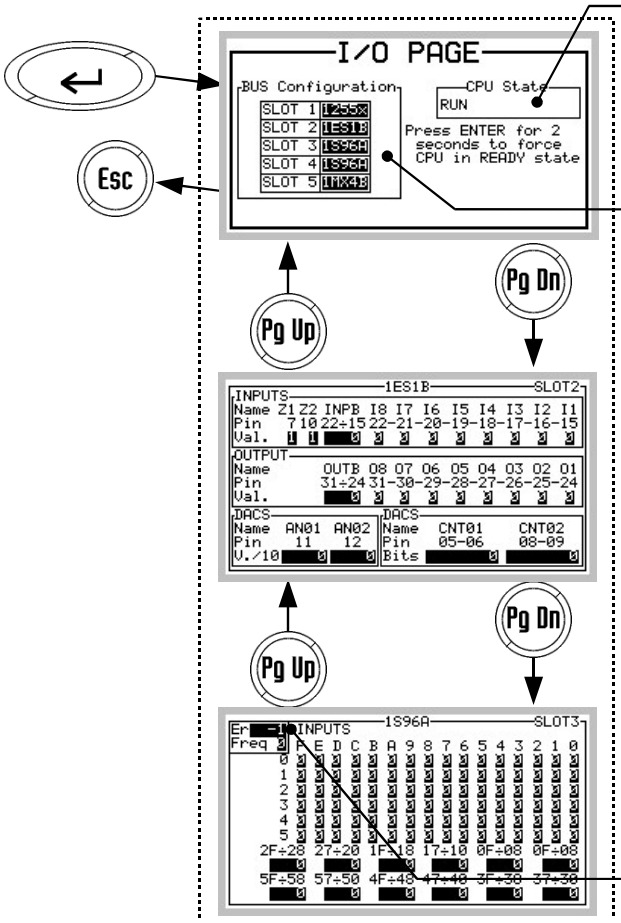
7.8.2.5. SETUP PAGE > Tests > I/O

Diagnostic inputs and outputs of the system.
In these pages the following words may be present:

Name	Mnemonic name of the I/O object.
Pin	Jumper name relative to the I/O object.
Val	Value of the I/O object.
DAC	Values in tenths of Volt (V./10).
COUNTER	Introduce a value comprised between -9999999 and +9999999.

To generate the output signals corresponding to the values introduced, keep pressed the key

; when you release it, all the output goes to zero.
The set value DONT ACTIVATE DIRECTLY THE OUTPUT as you press the ENTER key.



CPU State
READY, RESET: it's possible to introduce some values in the outputs.
RUN, STOP: it's just possible to show the values of the I/O. This state is signaled just with a message ONLY READ placed on the right to of each page .

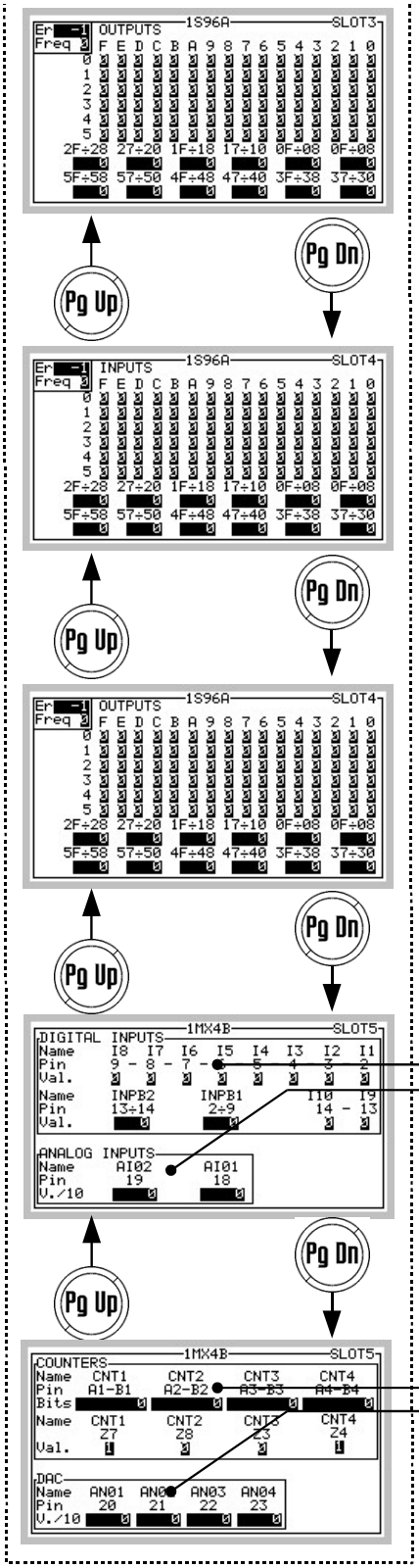
BUS Configuration
Configuration of the bus of the application Qview

I/O test of the SLOT 2

Test of the SLOT 3: Port A (Inputs)
The I/O tests of the slots 3 and 4 are relative to the remote input and output:
Since the numerous fields, it's used a exadecimal matrix address.

Er identifies the number of erros in the serial comunication (**-1**: disabled connection)

Follow the next page



Test of the SLOT 3: Port A (Outputs)

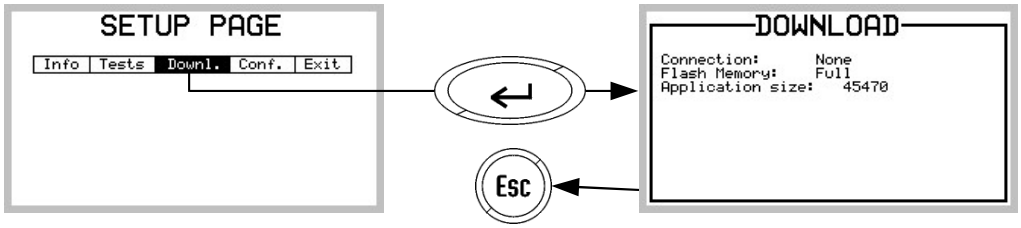
Test of the SLOT 4: Port B (Inputs)

Test of the SLOT 4: Port B (Outputs)

Test of the hardware in the SLOT 5 (MX4-Bx)
- Digital input
- Analog inputi

Test of the hardware in the SLOT 5 (MX4-Bx)
- Counter (value: -9999999 ÷ +9999999)
- Dac (value in tenths of Volts)

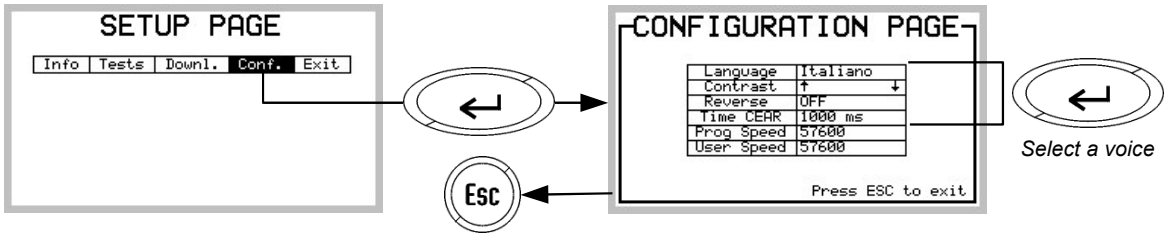
7.8.3. SETUP PAGE > Downl.



During the download of the graphic interface, this page with software data is visualized automatically by Qpaint

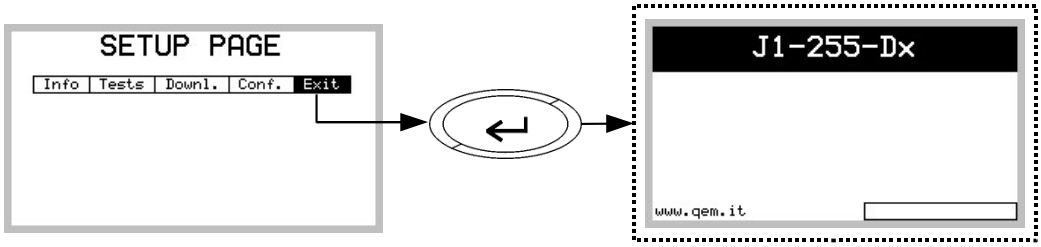
7.8.4. SETUP PAGE > Config.

Parameters configuration placed in the hardisk.



Parameter	Description
Language	Language choice
Contrast	Display contrast
Reverse	Inverse display color
Time CLEAR	Action time of the CLEAR key.
PROG Speed	PROG port speed set through dip-switch (page 28)
USER Speed	USER port speed set through dip-switch (page 28)

7.8.5. SETUP PAGE > Exit



After the confirmation with ENTER the system can show an error message for 5 seconds and then it goes back to the InfoPage.

7.9. Backup & Restore

The application Qview in the CPU is made of:

Non-changeable information	Information in the application that doesn't change (instruction code QCL, symbols used in the project, application title ...).
	Memorized data in the Flash Memory
Changeable Information	Information made during the download: - data areas for variables, - data areas for internal devices, - content datagroup and data where the value is modified during the functioning (all the application data).
	Memorized data in the buffered RAM memory.

Backup	Security copy, inside the flash-memory, of all the changeable data, recording it. This operation allows to restore all the existent parametrization. Conditions that allows the execution of the backup command: - CPU in READY status. - Application that doesn't use the ram memory of a value greater than the backup limit.
Restore	Restore all the application values with the ones at the moment of the moment of the backup. The content of the backup is canceled during the download procedure only if the application has different “configuration checksum” or “symbol checksum”. Conditions that allows the execution of the backup command: - It must be done backup previously. - CPU in READY or ERROR status.

7.10. Battery

The battery supplies the RAM memory in a way that all the meaningful data for the application remains unchanged at the turning off.

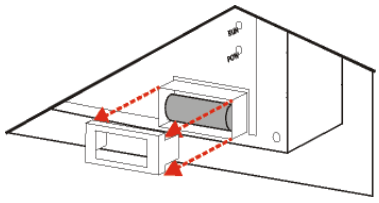
At each start up a check of the battery status is done:

Status	Description
BATT *flashing*	**Battery in exhaustion** Substitute rapidly the battery: the data are still stored in the memory.
BATT *fixed*	**Battery discharged** Substitute the battery: the data stored in the RAM memory may not be valid.

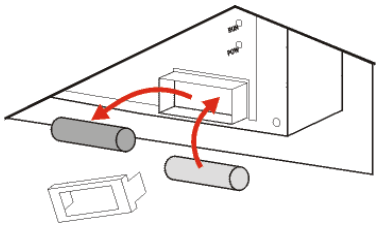
7.10.1. Battery's installation/substitution

Before proceeding with the substitution verify that the new battery is:
- charged (used suitable measure tool);
- compatible.

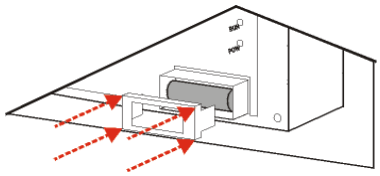
For more safety do a backup copy of data stored in the RAM memory with the procedure ***Project > Backup*** or with the procedure ***Project > Savedata*** from Qview.
The substitution must be done with instrument feeded (power on).



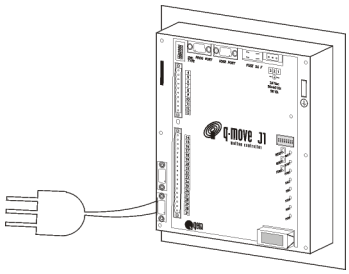
Take away the cover of the battery space;



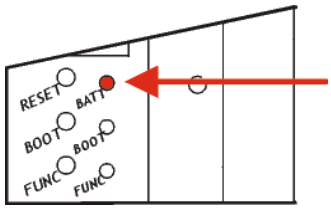
Substitute the battery being sure to respect the polarities signaled in the battery space.



Place the cover of the battery space;



Switch off and then on theminstrument



If the procedure is correctly done the BATT led will be turned off.

If after the substitution of the battery the BATT led will be turned on or flashing we advise to contact your furnisher.

In case the BATT led turns off, but the ERR led is flashing to indicate ***Error Checksum***, you need to restore the data saved through the procedure ***Project > Restore*** or ***Project > Realldata*** from Qview 5.
If it's done a ***Project > Backup*** it's possible to do a *Restore* without the necessity of a PC (***System functions*** page. 31).

After the substitution/installation of the battery, the HALT led will begin flashing. At this point, insert the correct date and hour, then reset the “Internal Error” following the procedure descripted at page 33.
(N.B: if the reset procedure fails, please switch off and switch on again the instrument, then repeat the procedure).

8. Information for programming

Development of machine control (Motion Controller + PLC)	QVIEW 5 or greater (libraries CARD S1-LIB5.1.31 or greater)
Development of interface page (HMI)	QPAINT 3 or greater

For further information about the programming see the specific manual of the development environment Qview, of the programming languages and of the devices.

8.1. BUS declaration

*From QVIEW 5 and later those codes are recognizable using the function **MONITOR > BUS**.*

Slot	Board name	Firmware version	Identification board	
1	1255D	xx(01,02...)		
2	1ES1B	00	14	*Terminal board 4÷31*
3	1S96A	00	18	*Port SIO A / B*
4	1S96A	00	18	*Port SIO A / B*

Example:

BUS

```
1 255D   01   ;slot 1
2 1ES1B  00   ;slot 2 (empty)
3 1S96A  00   ;slot 3 (empty)
4 1S96A  00   ;slot 4 (empty)
```

8.2. Maximum frequency of the interrupt units

In case of using these interrupt units in the project realized with Qview 5, it's necessary that the frequency of the pulses associated to these units is less than 333 Hz (pulses / second).

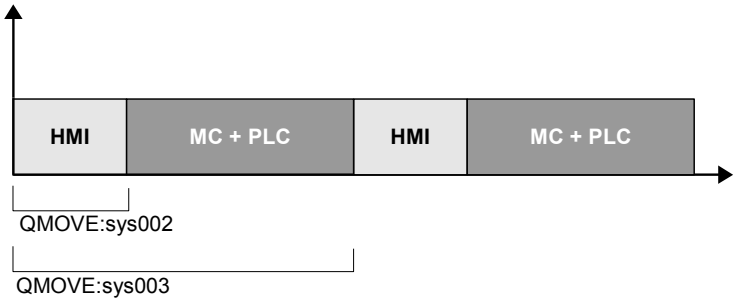
8.3. Serial ports address

The addresses of the serial ports to specify in the declaration of the devices MODBUS and SERCOM are:
PROG: 0,
USER: 1.

8.4. System variables

8.4.1. Resource management of CPU

The CPU of the instrument executes both the software destined to the control of the machine (realized with QVIEW) and the software for the interface operator (realized with QPAINT).
The following system variables allows to take part in priority management of the CPU.



HMI Time spent for the execution of the graphical interface (updating of the visualization, control of the pressure of the keys...)

MC + PLC Time spent for the control of the machine.

Variable	Description
QMOVE:sys002 (Time in % of 300 ms.)	Total time of a cycle period of the CPU. Expressed in % of 300 ms (3-100%) *Example:* QMOVE:sys002 = 50% -> time of 150ms.
QMOVE:sys003 (Time in % of 300 ms.)	Fraction % (3-90%) of the time decided with QMOVE:sys002 to spend to the execution of the graphical part. *Example:* QMOVE:sys002 = 50% -> time of 150ms. QMOVE:sys003= 25% -> time of 37.5ms.
QMOVE:sys001	Allows to set the variables QMOVE:sys002 and QMOVE:sys003 in automatic or manual mode. **1:** manual setting of the QMOVE:sys002 and QMOVE:sys003 with no blocks of the special units. **2:** manual setting of the QMOVE:sys002 and QMOVE:sys003 with blocks of the special units (time units or interrupt). **3:** automatic calculation of QMOVE:sys002 and QMOVE:sys003 with no blocks of the special units (default value). *Example:* QMOVE:sys002 = 66% QMOVE:sys003 is variable depending on the complexity of the visualization. **4:** automatic calculation of the QMOVE:sys002 and QMOVE:sys003 with blocks of the special units (default value). *Example:* QMOVE:sys002 = 66% QMOVE:sys003 is variable depending on the complexity of the visualization.

9. Available firmwares

9.1. Qview 5

For further information see the manuals relative to the devices.

In the table is shown the percentage of occupation for elaboration time of the CPU relative to 1ms. This data is useful to choose the sample time of the device.

Device	Description	Occupation in %	Firmware	
			01	02
ANINP 2	Analog input acquisition with management of two digital output in comparison.	6,06	✓	✓
EANPOS	Control of axes servo assisted through modulation of the velocity reference of the drive through analog output +/-10V (feedback from incremental encoder).	25,00	✓	✓
COUNTER 3	Acquisition incremental counters bidirectional with management of 2 digital output in comparison	12,43	✓	✓
DAC	Management of analog output.	-	✓	✓
OOPOS 3	Control of ON/OFF axes with feedback from incremental encoder and with management of the automatic inertia calculation.	14,87	✓	✓
CAMMING 3	Control of axes servo assisted synchronized through Synchromove technology with possibility of linear interpolation.	47,56	✓	-
CAMMING 4	Control of axes servo assisted synchronized through Synchromove technology with possibility of circular interpolation.	99,99	-	✓
RECDATA	Recording of data, variables and counting at a deterministic sampling.	4,78	✓	✓
MODBUS	Management of serial asynchronous communications in Modbus protocol both Master and Slave, both ASCII and Rtu.	50,00	✓	✓
SERCOM	Management of serial asynchronous communications.	4,80	✓	✓

9.2. Qpaint 4

Device	Description	Firmware	
		01	02
VALUE OBJECT	Viewer of the numeric value of a variable.	✓	✓
STRING OBJECT	Alphanumeric string	✓	✓
VALSTRING OBJECT	Variable string depending on the value of a variable.	✓	✓
IMAGE OBJECT	Fixed image	✓	✓
VALIMAGE OBJECT	Variable image depending on the value of a variable	✓	✓
VECTORE IMAGE OBJECT	Object for the vectorial drawing.	-	-
BOX OBJECT	Frames drawing	✓	✓

10. Assistance

10.1. Request of assistance

To provide you a faster service, at a minimum cost, we do need your help.

a)

a) *Follow all the information in the manual MIMAT (www.qem.it)*

b)

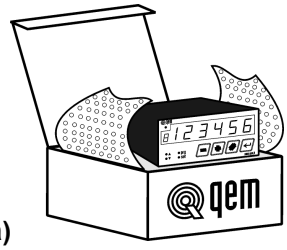
b) *If the problem persists, fill the Module for technical service attached to this manual and send it to QEM.*

c)

c) *Our technicians will get the fundamentals elements to understand your problem.*

10.2. Shipment

It is recommend to pack the instrument with materials that can damp eventual falls.

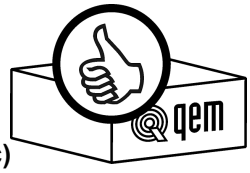


a)

a) Use the original package: *it has to protect the instrument during the transportation.*

b)

b) Attach:
- An anomaly description;
- Part of the electrical sketch where the instrument is inserted
- Programming of the instrument (set up, working quotes, parameters..).
- Request of a repairing estimate; if not requested the cost will be calculated at the end.



c)

c) An exhaustive description of the problem allows to find and solve your problem. An accurate package avoids further drawbacks.

Modulo per Assistenza Tecnica
Module for Technical Service

Ditta / *Firm* :..... Rif.:.....

Indirizzo / *Address*:.....
.....

Tel..... Fax.....

E – mail.....

Codice strumento / *Instrument Code* :.....

Alimentazione strumento / *Power Supply:* .....

Tipo di macchina / *Machine type*:
.....
.....
.....
.....
.....
.....

Descrizione ciclo macchina / Cycle machine description:
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Parametri / *Parameters*:
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Descrizione anomalia / *Anomaly Description*:
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.....

Frequenza anomalia / *Anomaly frequency* :

- ☐ Continuo / *Continous*
- ☐ Saltuario / *Irregular*
- ☐ Dopo un certo tempo / *After a few time*
- ☐ All'accensione / *At the switching on*
- ☐ Allo spegnimento / *At the switching off*
- ☐ Altro / ***Other***: .....

.....
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.....
.....

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Tel. +39 0444 440061
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http:\\www.qem.it
e-mail: info@qem.it

The CE mark of the instrument doesn't release the installer from the acknowledgment and the accomplishment of the prescriptive reference obligation of his product.